DOCUMENT RESUME

ED 123 301 UD 016 014

AUTHOR Coleman, James S.
TITLE School Desegregation and Loss of Whites from Large Central-City School Districts.
PUB DATE Dec 75
NOTE 34p.; Paper presented at a consultation with the Commission on Civil Rights (Washington, D.C., December 8, 1975)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage
DESCRIPTORS *Inner City; *Integration Effects; Integration Methods; Longitudinal Studies; National Surveys; Public Policy; *Racial Balance; Relocation; Residential Patterns; *School Districts; *School Integration; Statistical Analysis; Suburbs; Trend Analysis; Urban Schools

ABSTRACT

The analysis of this paper is directed primarily to the question of the effect of school desegregation on loss of white children from large central-city school systems. This analysis is taken from James S. Coleman, Sara D. Kelly, and John A. Moore, Trends in School Segregation, 1968-73 (1975). The data are taken from annual reports by all school districts in the country to the Office of Civil Rights of the Department of Health, Education, and Welfare on the racial composition of each school in the district. Before addressing the primary question, trends in racial segregation in the schools between 1968 and 1973 are briefly examined. The overall analysis concludes that the emerging problem with regard to school desegregation is the problem of segregation between central city and suburbs; and in addition, that current means by which schools are being desegregated are intensifying that problem, rather than reducing it. The emerging problem of school desegregation in large cities is a problem of metropolitan area residential segregation, brought about by a loss of whites from the central cities. This loss is intensified by extensive school desegregation in those central cities, but in cities with high proportions of blacks and predominantly white suburbs, it proceeds at a relatively rapid rate with or without desegregation. (Author/JM)

School desegregation and Loss of Whites from Large Central-City School Districts*

James S. Coleman

The analysis of this paper is directed primarily to the question of the effect of school desegregation on loss of white children from large central-city school systems. Before addressing this question, however, I will examine briefly trends in racial segregation in the schools between 1968 and 1973. First I will examine segregation among schools within the same district, and then segregation of black and white children among different school districts.

Trends in segregation within districts

There are several salient features of the trends in school segregation over the country between 1968 and 1972. First is the enormous variation among regions. In the Southeast, the fall of 1970 saw probably the single most extensive change in school organization in the history of American education. The school districts of the region shifted from the most segregated in the nation to the least.

In several other regions, there were reductions in segregation less extensive than in the Southeast, although the only other changes affecting many black children was in the Southwest. Throughout the

---

* The analysis in this paper is taken from James S. Coleman, Sara D. Kelly and John A. Moore, Trends in School Segregation 1968-73, Washington, D.C. : The Urban Institute, 1975. The data are taken from annual reports by all school districts in the country to the Office of Civil Rights of HEW on the racial composition of each school in the district.

parts of the North where most blacks lived, there was little or no reduction in segregation over this period. Table 1 summarizes these changes - and the absence of changes - for each of the regions.

Table 1*,#

Segregation within school districts in 1968 and 1972 in the U.S. and each region

Region	1968	1972	Change
United States	.63	.37	-.26
New England	.35	.33	-.02
Middle Atlantic	.43	.43	-.00
Border	.48	.44	-.04
Southeast	.75	.19	-.56
West South Central	.69	.48	-.21
East North Central	.58	.57	-.01
West North Central	.61	.56	-.05
Mountain	.49	.25	-.24
Pacific	.56	.42	-.14

As the table shows, there was very little change in segregation in the North and Midwest, during this period of remarkable change in the South.

A second principal feature of the desegregation that occurred during this period was that it took place to a much greater extent in small districts than in large ones. This was in part because nearly all the

---

* Several regions have been reclassified, because the character of racial segregation has differed within the region. Hawaii and Alaska have been separated as "outlying" states from the Pacific region; and the South Atlantic and East South Central have been combined and redivided into Border (Delaware, Maryland, West Virginia, Kentucky) and Southeast (all others in these two regions). In all tabulations, the Outlying states, Hawaii and Alaska, are dropped, because there is no black-white segregation in their schools, and the number of blacks in those states is very small.

The segregation measure is based on the proportion of whites in the average black child's school, standardized for the proportion of whites in the district.

small districts in which there are many blacks are in the South, where nearly all the desegregation took place, but in part because even in the South, the desegregation was more pronounced in the smaller districts. Table 2 shows well the differential reduction of segregation in this period both in the U.S. as a whole and in the Southeast, where desegregation was most pronounced. The smaller districts, which outside the Southeast were the least segregated already, showed greatest reduction in segregation, while the largest districts, over 100,000 in size (of which there are about 20 in the country as a whole) which were

Table 2

Segregation within school districts of different sizes in 1968 and 1972 in the U.S. and the Southeast

	U.S.			Southeast		
District Size	1968	1972	Change	1968	1972	Change
> 100	.71	.65	-.06	.84	.44	-.40
25-100	.66	.39	-.27	.77	.28	-.49
10-25	.54	.22	-.32	.70	.16	-.54
5-10	.59	.14	-.45	.74	.13	-.61
2.5-5	.56	.09	-.47	.74	.09	-.65
< 2.5	.44	.03	-.41	.70	.04	-.66

already the most segregated, showed least reduction in segregation. Between 1968 and 1973, of the 22 largest central-city districts, only five showed a reduction of segregation of more than 0.3 (Memphis, Tampa, Atlanta, Denver, and San Francisco), while six showed a reduction of less than 0.1, and six showed slight increases in segregation (New York, Chicago, Philadelphia, Cleveland, St. Louis, and Boston). These results suggest that segregation is a very different phenomenon in the large cities than in smaller districts, and is much more resistant to desegregation policies.

All of this, however, refers to matters of school desegregation within districts. Although nearly all desegregation policy has been limited to reassignment of children among schools within a district, the actual presence of black and white children in the same school depends not only on such assignment within districts, but also upon the presence of black and white children in the same districts. Consequently, what is necessary to get a more complete view of what has happened over this period is to examine changes in segregation between districts as well as the segregation within districts. It is to this between-district segregation that I now turn.

Trends in segregation between districts

At the same time that school desegregation was occurring in many school districts of the country, an opposing trend was occurring in the segregation of white and black children among school districts. There was an increase, in nearly every region of the country, in segregation between districts.* Table 3 shows this, with an increase in segregation everywhere except in the Border States.

---

* The segregation indices were calculated as in the preceding section, except that school districts rather than schools were taken as the unit of observation. Thus the index is based on the average proportion of white children in the average black child's school district, standardized by the proportion of whites in the region (or later, the metropolitan area).

Table 3

Segregation between school districts in 1968 and 1972 in the U.S. and each region

Region	1968	1972	Change
United States	.32	.36	+.04
New England	.25	.31	+.06
Middle Atlantic	.38	.44	+.06
Border	.48	.48	.00
Southeast	.18	.22	+.04
West South Central	.32	.37	+.05
East North Central	.30	.32	+.02
West North Central	.35	.39	+.04
Mountain	.15	.17	+.02
Pacific	.30	.34	+.04

The combination of this increase and the reduced segregation within districts means that by 1972, the segregation between districts within the region is greater than that within districts in three of the nine regions, while it was greater in no region in 1968. Thus the form of segregation that arises through residential separation of blacks and whites into different districts has increased throughout the country at the same time that the form of segregation that exists within districts has been reduced.

The same contrasting changes can be seen for the largest metropolitan areas. Although within-district segregation decreased to a greater or lesser extent in 16 of the 22 largest central-city districts between 1963 and 1972, the segregation between districts in the metropolitan areas of these central cities decreased in only one, the Washington, D.C., metropolitan area, with increases as high as .15 (in Atlanta), .11 (in Houston) and .10 (in Detroit and Dallas). It is, in fact, in these largest metropolitan areas that the segregation between

districts is increasing most rapidly. Furthermore, this form of segregation is one that is a more severe segregation, because it constitutes greater residential distance between black and white children than exists when segregation is among schools within the same district.

The increase in between-district segregation at the same time that there is in some districts reduced segregation within the district raises the question about a causal connection between the two: did desegregation within central-city school districts during this period lead to a loss of white children from these central-city districts which has the result of separating black and white children into separate school districts? It is clear that the loss of white children from central city schools was occurring before any desegregation, and occurred in those cities where no desegregation occurred as well as in those where it did occur. What we want to ask is whether this loss of whites from the central city schools is accelerated when substantial desegregation takes place. It is to that question that I now turn.

THE SIZE OF INDIVIDUAL SEGREGATING RESPONSES TO DESEGREGATION

It is clear from the preceding sections that there is a segregating process occurring through individual movement, primarily of white families, from schools and districts in which there is greater integration or a greater proportion of blacks, to schools and districts in which there is less integration or a smaller proportion of blacks. The consequences of this, of course, are to partially nullify the effects of school desegregation as carried out by various governmental or legal agencies.

What is not yet clear is whether desegregation itself induces an increased movement of whites from the desegregated district. This is a difficult but important question to answer, because desegregation in particular school districts is a direct outcome of social policy or legal rulings, and it is important to ask whether there are indirect consequences of desegregation itself which partly nullify it, and if so, what the size of this response is under various circumstances.*

* There have been several studies of the effect of school segregation on the loss of white children from the desegregating school system. In an attitude survey of parents in eight Florida countywide desegregated school districts, one group of authors (Cataldo et al., 1975) concluded that when the racial composition of schools is less than 30% black, almost no whites leave; but beyond 30% a higher proportion leave. Mercer and Scout in a comprehensive (as yet unpublished) survey of white school population changes in California districts between 1966 and 1973 found no relation between population changes and the amount of desegregation undergone in the district. Charles Clotfelter (1975), in contrast, shows that desegregation in Mississippi had a significant effect on private school enrollment, an effect that increased with increasing proportions of blacks in the schools. Reynolds Farley (1975) used the same OCR data used in our analysis, but only up to 1972. He found no relation of school integration to white population loss for 125 cities with 100,000 or more population and at least 3% blacks, and also for the largest northern and southern cities. His methods differ, however, from our own in several respects, particularly in our year-by-year examination contrasted to his five-year examination.

The question is difficult because casual observation shows that desegregation has evoked differing reactions in different cities, and because desegregation has taken place in very different settings. For example, in many areas of the South, school systems are countywide, encompassing both a city and the surrounding suburbs. Leaving a desegregated system in that setting entails leaving the public school system itself, or a rather distant move (unless adjacent counties have also desegregated, which was a common occurrence in the early 1970's in the South). This, of course, is more difficult than a move to a separate predominantly white suburban school system, which is the common pattern in the North. Another variation is in city size, which creates nearly a qualitative difference in the character of desegregation. For full-scale desegregation in a large city entails mixing student populations that are much more socially distinct and more residentially separated than in small cities.

Additional complications include these:

a. Most desegregation in this period took place in the South, so that except as there was a similar response in those few places in the North that did segregate, the generalization of results to northern cities must remain a question.

b. There was a general loss during this time of whites from central cities, a loss which preliminary analysis indicates is greater as the size of the city is greater, and as the proportion black in the city is greater.

c. The available data show simply the student populations of each race for each of the six years, 1968-73, so that only changes in student populations are directly measured. This is not exactly the same as movement, although something about net movement of a racial group out of the district's

schools can be inferred from these measures of gain or loss.*

d. If there is a loss of whites when desegregation occurs, it is not clear what the time progression of this loss is. When does it begin? Does it continue, and accelerate as the proportion white in the schools declines, or is it a one-time response which does not continue once the degree of desegregation is constant? Or does it in fact reverse itself, with whites returning to the district's schools a year or so after they have desegregated? Initial observation of particular cities which have fully desegregated suggests that a loss due to desegregation begins in the same year that desegregation takes place, but its subsequent course is less clear. Using these indications from individual cities, we will first attempt to examine the loss of whites in the same year that desegregation occurs.

These difficulties are not overcome simply, but the data are extensive, showing racial composition of schools over each of the six years 1968-73.** The cities to be examined are divided into two groups because of the indications that response to desegregation differs considerably in very large cities from the response in smaller ones: 1) twenty-one of the twenty-three largest

---

*Fertility changes among whites also affect the change in numbers of white children in the schools. Fertility of whites in the years preceding this period was declining, which leads to a general decline in white student populations. This affects the constant term in the regression equations, but not the indicated effects of desegregation, unless the decline in white fertility was by some chance greater in those cities that desegregated. The covariance analyses even controls for that possibility (see p. 71).

**Schools are not identified each year in a way that makes possible tracing changes in individual schools.

districts in the country classified as central-city districts;* 2) forty-six of the next forty-seven largest central-city districts.**

These cities are divided into two groups because the response to desegregation appears, as indicated above, different in the largest cities from smaller ones. In analyzing the question of how loss of white students is related to desegregation, we will first examine the loss that is related to reduction in segregation in the same year. The measure of segregation used is the

---

*Washington, D.C., which has only about 3% white, is excluded because it is already racially homogeneous. Alburquerque, the 22nd largest central-city district, was excluded because the city of Alburquerque is not among the first 50 in population. Size of central-city district corresponds reasonably well to size of city, but there are some discrepancies. This set of districts included 19 of the largest 21 cities in the country by the 1970 census (excluding only San Antonio and Phoenix). In addition, it includes Denver (the 25th largest), Atlanta (the 27th largest), and Tampa (the 50th largest). The latter is a county-wide school district, which accounts for the large district size relative to city size. In preliminary analyses, only the largest 20 central-city districts were included, excluding Denver and San Francisco. However, because Denver and San Francisco were two of the few northern cities to undergo extensive desegregation during the period 1968-73, they have been included.

**Richmond, Va., which annexed some suburban districts in the same year it underwent extensive desegregation, was excluded. It was not possible to tell from Richmond the exact size of white loss from the original district, although the loss in years subsequent to the annexation shows that it was substantial. Memphis also had annexation, but its size was affected only slightly, so it was not excluded.

standardized measure r_{ij} presented in earlier sections.*

In this analysis, all years are taken together (that is, Δr_{ij} in 68-69 is related to change in whites in 68-69, Δr_{ij} in 69-70 is related to change in whites in 69-70, etc.) in an equation as follows:

$$(4) \qquad \frac{w_t - w_{t-1}}{w_{t-1}} = a + b_1 \Delta r_{t,t-1} + b_2 p_{bt-1} + b_3 \ln N_{t-1}$$

where:

w_t is number of white students in the system in year t

r_t is the standardized measure of segregation in year t

p_{bt-1} is the proportion black in the system in year t-1

N_{t-1} is the number of students in the system in year t-1

---

*It seems likely that the tendency of white families to leave the system is related not to a change in the "index of segregation," but to a change in the proportion of blacks in their child's school. Thus a change in the unstandardized measure of earlier sections, s_{ij} (the proportion of black children in the average white child's school), should be more directly related to loss of whites than is r_{ij}. However, the unstandardized measure is affected by the number of white children in the system, and thus any analysis including it must relate the change in s_{ij} in the previous year to the loss of whites in a given year. A discussion in Appendix 3, however, indicates how one might use the change in s_{ij} as a determinant of loss of whites in the same year. The relation between the size of a change in s_{ij} and the corresponding change in r_{ij} depends on the proportion black in the system. When it is .5, which is about average for the largest 22 central-city districts, then the change in r_{ij} is twice the change in s_{ij} (since $r_{ij} = (p_j - s_{ij})/p_j$). It is because both the numerator and denominator of the formula for r_{ij} are affected by loss of whites to the system that r_{ij} in a given year is approximately independent of loss of whites in that year.

The analysis is carried out for t = 69, 70, 71, 72, 73. They are taken together to obtain an average effect over the five years, because among the 22 cities, massive desegregation in any one year in one city can distort results for that year. The two additional variables of proportion black in the system and number of students are included because these variables appear to be related to loss of whites from the system independently of the change in segregation.

Note that the independent variable measuring change in segregation $\Delta r_{t,t-1}$, is just that. It is not a measure of a particular form of change in segregation, such as bussing, nor even of a desegregation policy. Change in r can occur through individual movement of black or white students; and certainly the slight upward movement of segregation (as measured by r) in some northern cities is just that. However, these individual movements make only small differences in r over any year. Large negative values for Δr are due to desegregation policies instituted in that city. Although the term "desegregation" to a civil rights lawyer may mean only the move to full racial balance in all schools, it is important to remember that the desegregation variable used in this analysis refers to a reduction of any size in the index of segregation.

The results of the analysis are presented in Table 14. The table presents the coefficients to the above equation for the largest 21 central-city systems and the next 46, along with standard errors of the coefficients and amount of variance accounted for. To gain some sense of the magnitude of the effects represented by these coefficients, we can express what the expected yearly rates of loss of white students would be in various circumstances. It is important to remember that these are <u>average</u> effects, which

Table 4.

Regression Coefficients for Analyses of White Student Loss to Central Cities

Equation 1	Largest 21	Next 46
ΔR	.279 (.062)	.056 (.026)
Prop. black	-.133 (.023)	-.090 (.014)
ℓn N	.000 (.008)	-.042 (.010)
Constant	.013	.452
R^2	.29	.26
Number of Observations	(105)	(226)

Including inter-district segregation in SMSA, and interaction of desegregation with South:

Equation 2		
ΔR	.199 (.156)	-.148 (.137)
Prop. black	-.044 (.039)	-.035 (.016)
ℓn N	.060 (.008)	-.041 (.010)
R SMSA	-.165 (.050)	-.110 (.021)
ΔR x S	.143 (.170)	.242 (.137)
Constant	-.059	.438
R^2	.36	.35

Including interactions of desegregation with proportion black and inter-district segregation, and also including South as a dummy variable:

Equation 3		
ΔR	-.459 (.184)	-.349 (.151)
Prop. black	.051 (.037)	-.026 (.019)
ℓn N	.003 (.006)	-.039 (.009)
R SMSA	-.210 (.044)	-.102 (.025)
ΔR x South	.148 (.198)	.244 (.145)
ΔR x Prop. black	1.770 (.307)	.511 (.215)
ΔR x R SMSA	.561 (.494)	.894 (.314)
South	-.006 (.010)	-.002 (.006)
Constant	-.039	.414
R^2	.60	.40

differ from city to city, as will become apparent in subsequent analysis.

1. For a city with the average number of students, with no blacks and no reduction in segregation, the expected loss per year is:
   a) Largest 21: (gain of) 0.9% of whites present at beginning of year (average number of students is 169,000)
   b) Next 46: 1.2% of whites present at beginning of year (average number of students is 58,000)
2. Additional expected loss if the city is 50% black:
   a) Largest 21: 6.8% of whites present at beginning of year
   b) Next 46: 4.5% of whites present at beginning of year
3. Additional expected loss if the city experiences a decrease of .2 in the index of segregation in that year:*
   a) Largest 21: 5.5% of whites at beginning of year
   b) Next 46: 1.1% of whites at beginning of year
4. Additional expected loss if a city was twice its size:
   a) Largest 21: 0% of whites present at beginning of year
   b) Next 46: 2.9% of whites present at beginning of year

Taking the first three losses together, the expected loss of whites from a city system with 50% blacks would be:

---

* A decrease of .2 in the index of segregation is approximately equal to an increase of 10% in the black schoolmates of the average white in the system if the proportion is .50.

For the largest 21:

with reduction of .2 in segregation: (-)0.9% + 6.8% + 5.6% = 11.5%

with no change in segregation: (-) 0.9% + 6.8% = 5.9%

For the next 46:

with reduction of .2 in segregation: 1.2% + 4.5% + 1.1% = 6.8%

with no change in segregation: 1.2% + 4.5% = 5.7%

These results suggest that the impact of desegregation is quite large for the largest 21 districts, of the same order of magnitude as other effects; but that for the next 46 cities, the impact is much less, considerably smaller than that due to other factors. (The average loss of whites per year in the largest 21 cities was 5.6% of those present at the beginning of the year, and in the next 46, 3.7%.) It should be remembered also that this is an effect for the year of desegregation only; we do not yet know about subsequent effects.

But how does a decrease of .2 in the segregation index compare to the actual declines that occurred in segregation in these cities in any single year? One way to get a sense of this is, as stated earlier, from the fact that in a city with .5 blacks in the schools, an increase of 10% blacks in the average white child's school is equivalent to a decrease of .2 in the segregation measure. To give another sense of the magnitude of a change of.20, the cities among the 21 largest districts are listed below in which a reduction in segregation of .10 or more occurred in any single year, together with the year it occurred:

City	Year	Reduction in segregation
Houston	69-70	.11
Dallas	70-71	.19
Memphis	72-73	.48
Tampa	70-71	.52
Indianapolis	72-73	.18
Atlanta	69-70	.11
	72-73	.15
Denver	68-69	.22
San Francisco	70-71	.16

Eight of the 21 cities underwent a reduction in segregation of .1 or more in any single year, and three a reduction of .2 or more (and seven of them underwent a reduction of .2 or more over the total period 68-73). Among the next 46, 13 underwent a reduction of .2 or more over the whole period, and 10 of these a reduction of .4 or more. Many cities, of course, underwent no desegregation at all, and their segregation indices remained approximately constant, or increased.

A next step which can be taken (or two steps at once) is to attempt to consider two more factors which differ among cities which have experienced desegregation, factors which may affect the rate of loss of whites. One is location in the South or North. This factor we do not expect to affect the general loss of whites, but only their loss when desegregation occurs. Thus we can ask what is the effect of desegregation of .2 for southern cities,

and what is the effect for northern cities? Second, cities differ in the degree to which a suburban alternative is available. Some cities, either because the school district encompasses all or most of the metropolitan area, or because the rest of the metropolitan area is about the same racial composition as the central city, have no such available havens. Thus we can ask how the loss of whites is affected by the racial disparity between city and suburbs, or what we have called in an earlier section, the between-district segregation.

A regression equation which includes these two variables gives results as indicated in Table 14, which allow the following estimates:

Estimated increase in loss of whites in one year as a function of reduction of .2 in index of segregation:

	South	North
Largest 21	6.8%	4.0%
Next 46	1.9%	*

These results show that indeed there has been a greater loss of whites when desegregation has taken place in large southern cities than when it has taken place in large northern cities, with the estimate nearly twice for the southern cities what it is for northern ones. For the smaller cities, there is a smaller loss for the Southern cities though no effect can be estimated for the North in these smaller cities.

For this analysis with the two additional variables, we can also ask what differences in loss of whites are associated with a difference between 0 and 50% black in the city schools and a difference between 0 between-district segregation and .4 between-district segregation.

---

* No reliable estimate for the North can be made since the correlation between Δr and Δrx South is .983 (i.e., nearly all changes in segregation occured in the South in these 46 cities). See footnote on page 19 for further discussion.

Estimated increase in loss of whites in on year as a function of 50% black in city school district and between-district segregation of .4:

	50% black	Between-district segregation of .4
Largest 21	2.2%	6.6%
Next 46	1.7%	4.4%

The estimates show that the loss which was earlier seen as resulting from the proportion black in the city can in fact in considerable part be accounted for by the between-district segregation, which is a function of the difference between proportion black in the city and that in the suburbs. Thus the frequent observation that the loss of whites from central-city school systems depends on the existence of suburban systems with high proportions of whites is certainly confirmed by these data. Note, however, that this is a generally greater loss of whites under such conditions, not related to the period of desegregation. The question of whether there is additional loss at the time of desegregation can be answered by a further analysis, to which we now turn.

In this analysis, we include not only the possibilities that have already been examined, but three others as well:

a) The possibility that there is a generally different loss rate of whites from central cities in the South than in the North, in the absence of desegregation

b) the possibility that desegregation produces different rates of loss when the proportion black in the city differs (interaction between proportion black and change in segregation)

c) the possibility that desegregation produces different rates of loss when the inter-district segregation differs

The estimates of these effects can best be expressed as the total estimated

loss rates under different illustrative conditions.* We will consider what the loss rates would be for the average size district in the South for each group of cities where the reduction in segregation is .2, as in earlier illustrations. Estimates are given for various combinations of proportion black in the central-city district, ranging from .25 to .75 and between district segregation ranging from 0 to .4.

The tabulation below shows the estimated loss rates under these various illustrative conditions.

Between-district segregation	Largest 21 proportion black			Next 46 proportion black		
	.25	.50	.75	.25	.50	.75
0	2%	10%	17%	3%	6%	9%
.2	9	16	24	8	11	15
.4	15	23	30	14	17	20

* The individual coefficients from Table 14 if interpreted alone without combining both the interaction terms and the main effects are not meaningful. Thus the negative sign on the coefficient for Δ r is not itself interpretable, without the compensating positive coefficient of Δ rx proportion black. Even so, particular combinations of values for the variables would show results that would seem unlikely on their face (for example, integration at very low proportions black apparently bringing about a small gain in proportion of whites in city schools, rather than a loss, or increased proportion black apparently bringing about a small gain as well). This is probably due to misspecification of the equation -- for example, some nonlinearity in effect of proportion black, not allowed by the equation as specified, or to a tendency of two highly correlated variables to have coefficients that polarize, due to minor sampling fluctuations. (See "Instabilities of Regression Estimates Relating Air Pollution to Mortality," Gary C. McDonald and Richard C. Schwing, Technometrics, Vol. 15, No. 3, Aug. 1973.) Finally, there is the fact that some coefficients would give meaningless values of rate of loss (e.g., over 100%) for extreme values of the independent variables (e.g., Δ r = 1 and proportion black = 1.0). This is due to a deliberate misspecification of the equation. The appropriate dependent variable would have been logarithm of (whites in year t/whites in year t-1), rather than (whites in t-whites in t-1)/ (whites in t-1). The latter was used because it gives almost the same results as the former, and the coefficients are more directly expressible as additions to a given rate of loss.

These estimates are for a city in the South. In the North the losses at the time of reduction in segregation are estimated to be 3. % less in the largest 21 cities with no reliable estimate possible in the next 46. / However, it should be recalled that more desegregation took place in the South, so that the estimates are less reliable for northern cities. It should also be noted that some combinations of proportion black and between-district segregation are impossible or quite unlikely, such as .25 proportion black and .4 between-district segregation, or .75 black and 0 between-district segregation.

The most striking from these illustrative estimates are two effects. One is the large increase in the effect of desegregation on rate of white loss as the proportion black in the district increases. This effect exists in both size cities, though it is more pronounced in the largest 21. There is a similarly large increase in the effect of desegregation on white loss if there are suburban alternatives, as measured by a high value for between-district segregation. In this case, the estimated augmentation effect is high both for the smaller cities and for the large ones.

The analysis above does not, however, answer certain other questions, such as the losses of whites in subsequent years. To examine this question, we can slightly modify equation (4), and examine the loss in a given year as a function of the desegregation not only in that year, but in preceding years:

$$\frac{W_t - W_{t-1}}{W_t} = a + b_{11}\,\Delta r_{t,t-1} + b_{12}\,\Delta r_{t-1,t-2} + b_2\,p_b + b_3 \ln N \qquad (5)$$

and two more equations, including respectively $b_{13}\,\Delta r_{t-2,t-3}$, $b_{13}\,\Delta r_{t-2,t-3} + b_{14}\,\Delta r_{t-3,t-4}$, and $b_{13}\,\Delta r_{t-2,t-3} + b_{14}\,\Delta r_{t-3,t-4} + b_{15}\,\Delta r_{t-4,t-5}$. The last of the equations, which examines effects of desegregation over the preceding five years, is the most complete, but gives the least accurate estimates, since it is based only on the loss in 72-73, and includes only

21 observations. Thus, only the first four equations will be used and only the first three coefficients, for which there are multiple estimates, will be calculated by averaging over the equations. These results will give an indication of the time pattern of white loss following desegregation.* The indication must be preliminary, because asking as detailed a question as this of data which consist of a limited number of desegregation experiences, some of which occurred only in 71-72 or 72-73, cannot provide a conclusive answer. Nevertheless, it is useful to attempt to obtain even a preliminary answer to the question. Table 15 shows for successively greater numbers of terms, up to three, the estimates for coefficients. When these coefficients are averaged as described earlier to attempt to estimate the succeeding effects of integration, the results are not very satisfactory, nor even highly consistent, except for the first term (the year in which integration took place). The second year shows essentially no effect while the third year shows an improbably large positive effect.** Thus, this attempt must be regarded as unsuccessful for statistical reasons (probably the particular years of desegregation associated with estimates for particular lags). The most that can be said is that there is no evidence for a return to city schools in

---

* The possible indirect accelerating effects of desegregation on white loss through its effect on increasing the proportion black (p_b in equation (5)) is not reflected in the coefficients b_{11} through b_{15}. That effect can be calculated to determine, for example, the effect in year 2 through $\Delta r_{t,t-1}$ in Δp_b and then the product $b_2 \Delta p_b$.

** One reason for suspecting estimates of Δr_{t-2} is that they are heavily dependent on changes in segregation that took place in 1971-72, and among the 21 cities, there were no large changes during that year.

Table 5
Further Analysis Results (Equations include proportion black and inter-district segregation)

Large 21

Years of desegregation	ΔR_t	ΔR_{t-1}	ΔR_{t-2}	R^2
69-73	.320 (.060)			.35
70-73	.330 (.069)	.009 (.080)		.35
71-73	.279 (.065)	-.035 (.078)	-.022 (.075)	.43
72-73	.603 (.096)	-.082 (.068)	-.048 (.070)	.71
Next 46				
69-73	.089 (.025)			.34
70-73	.076 (.026)	.034 (.026)		.31
71-73	.102 (.032)	.024 (.025)	-.024 (.027)	.42
72-73	.130 (.050)	.051 (.033)	-.045 (.029)	.40

Estimated added losses of whites due to desegregation in first year of desegregation, in second year, and third year, assuming reduction of .2 in segregation index.*

	First year	Second year	Third year
Large 21	7.7%	0.7%(gain)	0.7%(gain)
Next 46	2.0%	0.7%	0.7%(gain)

*Unweighted averages of above estimates were used because standard errors were nearly alike.

the second or third year after desegregation nor any strong evidence for a delayed loss in the second and third years after desegregation. (There is, however, an indirect effect in subsequent years through the increase in proportion black that occurs during the first year.)

There is another more stringent test of segregating effects of school desegregation than those we have examined so far. Each city, with its own particular housing patterns, suburban configurations, crime levels, distribution of racial prejudices, industrial growth or decline, and other factors, has rates of white loss that are specific to it. A rough test of this sort can be carried out for the largest cities by using the white student loss that occurred in each city in 1968-69, before much desegregation occurred in any of these cities (except for Denver), and observing what occurred from 1969 to 1973. For the twelve districts of the 22 which did not experience a reduction of at least 0.1 in segregation over the period 1968-1973 (and on the average experienced no change at all), loss of white students expected between 1969 and 1973, based on their 1968-69 losses, was 17% of the white students present in 1969. The actual loss during this period was 20%, only slightly greater than expected. For the ten districts which did experience desegregation of 0.1 or more, their expected loss between 1969 and 1973, based on the 1968-69 before desegregation losses, was only 10%. But their actual 1969-73 losses averaged 26% of the white students present in 1969. Table 16 shows these figures for each city separately.

A more careful statistical examination of this sort may be made by introducing into the regression equation a dummy variable for each city. Since in equation (4) there are five observations for each city, the degrees of freedom in the equation are $5n - n - 3$.

Table 6

REDUCTION IN SEGREGATION 1968-1973, EXPECTED AND ACTUAL LOSS OF WHITE STUDENTS 1969-1973, 22 LARGEST CENTRAL CITY DISTRICTS

District	Reduction in Segregation	Proportion of Whites Present in 1969 Lost by 1973	
		Expected (based on city's 1968-69 loss*)	Actual
1. New York	(+) .03	.12	.16
2. Los Angeles	.07	.10	.21
3. Chicago	(+) .02	.16	.25
4. Philadelphia	(+) .08	.13	.13
5. Detroit	.04	.33	.30
6. Houston*	.17	.19	.29
7. Baltimore	.02	.09	.17
8. Dallas*	.22	.06	.25
9. Cleveland	(+) .02	.22	.12
10. Washington	.04	.36	.42
11. Memphis*	.62	(+) .10	.37
12. Milwaukee	.03	.07	.16
13. San Diego*	.12	.00	.08
14. Columbus, Ohio	.04	.05	.12
15. Tampa*	.74	(+) .09	(+) .11
16. St. Louis	(+) .03	.17	.25
17. New Orleans*	.15	.13	.38
18. Indianapolis*	.28	.10	.24
19. Boston	(+) .03	.11	.14
20. Atlanta*	.37	.27	.59
21. Denver*	.38	.09	.19
22. San Francisco*	.31	.39	.33
*Average for 10 cities which had 0.1 or more reduction in segregation		.10	.26
Average for 12 cities which had less than 0.1 reduction in segregation.		.16	.20

* Expected loss equals $1 - (1-x)^4$, where x equals the proportion white students lost in 1968-69.

This analysis makes a somewhat different comparison than the previous ones. In those analyses, districts which have desegregated are compared with those that have not, to discover the effect of desegregation on loss of white students to the system. In this analysis, by contrast, we compare districts that have desegregated with their own expected rates of loss in the absence of desegregation, to discover any additional loss of whites due to desegregation. This is obviously a much more stringent test because it controls for the general characteristics of each city. The equations used in the analysis include proportion black, logarithm of number of students, and between-district segregation, with the addition of a dummy variable for each city. The results of the analysis give coefficients for Δr of .262 (.057) for the largest 21 city districts, and .098 (.025) for the smaller cities.* These coefficients correspond closely to those found in earlier equations, indicating that the estimate of the average additional loss rate during desegregation is a stable one, and not due to uncontrolled characteristics of the cities.

Finally, it is possible to carry out a full analysis of covariance, in which we can not only control for the characteristics of the individual cities, but also estimate the loss rate under desegregation for each city which underwent substantial desegregation.** These estimates are probably as close as we can obtain to the actual effects of desegregation on white loss in the year of desegregation. They show that the estimated white loss does vary

---

* R^2 in these equations are .65 and .60 respectively.

** This analysis is carried out by an equation with Δr (change in segregation), dummy variables for each city, and interactions between the city dummy variable and Δr. The coefficient for each city is the same as the sum of the coefficients for Δr and the interaction term.

considerably from city to city, and that the average loss rate specified earlier obscures very different loss rates in different cities. Table 17 shows the estimated loss rate in the year of desegregation if Δr were .2, for all cities listed earlier which underwent desegregation of .1 or more in a single year. These rates must still be regarded as only estimates because there are other things varying concurrently with desegregation. For three of these, proportion black, between-district segregation, and size of district, the equation has controlled the general effects; but the specific effects of each of these variables (as well as others) may differ from city to city. Nevertheless, these figures do indicate where the losses due to segregation are especially great, and where they are small.

Table 7
Estimated Additional Loss of White Students In Specified Cities

(Loss during desegregation in cities which had a Δr in one year of -.1, beyond general loss of whites in those cities. Desegregation assumed is $\Delta r = -.2$.)

City	Estimated loss as a percent of white students present at beginning of year
Houston	(gain) 9.1%
Dallas	7.9%
Memphis	15.6%
Tampa	2.6%
Indianapolis	6.7%
Atlanta	16.7%
Denver	(gain) 4.0%
San Francisco	5.1%
Average	5.2%

NOTE: Professor Reynolds Farley (personal communication 10 September, 1975) has pointed out to us that Houston, Dallas, Memphis, and Denver annexed substantial amounts of territory during the period 1970-73, so that the losses for those cities may be underestimated due to an undetermined number of white children added through annexation. Thus the apparent gains for Houston and Denver may well be due to annexation.

Now that we have some sense of the magnitude of the losses of whites in the year in which desegregation occurs, and how that magnitude varies among different cities, it is useful to ask just how much difference this makes in the long run in the city's population composition. For insofar as we can determine, the effect of desegregation is a one-time effect. The present data give no good evidence that there is a continuing increased loss of whites from city schools after desegration has taken place. On the other hand, there are secondary impacts of the initial loss: it increases the proportion of blacks in the schools, which itself increases the rate of loss. And it increases the racial disparity between suburbs and city, also increasing the rate of loss. Yet these are second-order effects and their overall impact is not clear.

One way of gaining a sense of the difference that sharp desegregation makes in the racial composition of a city in subsequent years is to consider a hypothetical city with particular characteristics, and apply the coefficients of the equations to the changing population composition of the city, year by year, under two conditions: with sharp desegregation in the first year, and without any change in segregation.

We will do this with two of the equations for the large cities: the simple equation including only Δr, proportion black, and logarithm of student population (Equation 1 in Table 14); and the most complex equation, including three interaction terms (Equation 3 in Table 14).

Assumed characteristics of the district in year 0:

1. Proportion black = 0.50
2. Proportion white = 0.50
3. Average size student body for the largest 21 (169,000)

*4. Suburban ring equal in size to central city, and all white (this means that initial between district segregation for SMSA is .33).

*5. Located in North.

*6. No overall change in student populations in SMSA; white losses from central city appear in suburbs.

*7. No movement of blacks to suburbs.

(Starred items are relevant only to Equation 3 in Table 14.)

The population compositions of the cities will be projected under two assumptions: first, that there is no change in segregation ($\Delta r = 0$); and second, that in year 0, there is a drop of .4 in r. This would not be total desegregation in most large cities, (see, for example, Table 13) but it would reduce the segregation by about half, and in some cases more, and be very substantial desegregation.

Equation 1, including only Δr, proportion black, and logarithm of size, certainly does not include all the ways in which desegregation can have an impact on white student loss. On the other hand, Equation 3 may overstate the initial loss upon desegregation through the magnitude of the interaction terms and may understate the losses after desegregation. The two equations show, however, something about the range of effects that might be expected for a city with these characteristics.

PREDICTED PORTION BLACK IN YEAR

Year:	0	1	2	3	4	5	6	7	8	9	10
Equation 1											
with desegregation (.4)	.5	.54	.56	.58	.60	.61	.63	.65	.67	.69	.70
without desegregation	.5	.51	.53	.55	.56	.58	.60	.61	.63	.65	.67
Equation 3											
with desegregation (.4)	.5	.58	.60	.62	.63	.65	.67	.69	.71	.73	.75
without desegregation	.5	.51	.52	.54	.55	.56	.58	.59	.61	.63	.65

We should emphasize that these projections are not intended as predictions for any city. They are intended rather to give a better perspective on what these equations imply for the impact of desegregation on the city's population composition.

The equations give considerably different projections, but perhaps the most important point is that the impact of desegregation, as a one-time impact, matters less in the overall population composition of the central city than does the continuing loss of whites with or without desegregation. According to Equation 3 from Table 14, there would be a 10% difference in the proportion black in the city at the end of ten years due to desegregation; but even without desegregation, the proportion would have increased from .5 to .65. And according to Equation 1 from Table 14, the difference due to desegregation would be only 3% at the end of the 10 years, but with about the same general increase in proportion black.

It is useful also to see the projected proportion of white schoolmates for the average black child under these conditions, and the proportion of black schoolmates for the average white in the metropolitan area. These are given below, assuming an initial segregation of .8, reduced to .4 under desegregation.

	White schoolmates for average black		Black schoolmates for average white	
	Year 0	Year 10	Year 0	Year 10
Equation 1				
with desegregation	.30	.18	.15	.09
without desegregation	.10	.07	.05	.03
Equation 3				
with desegregation	.30	.15	.15	.08
without desegregation	.10	.07	.05	.04

These projections show that under all conditions, there is an extensive decline in interracial contact over the ten years. The interracial contact under desegregation is projected to remain higher after 10 years than it was in year 0 under no desegregation; but the projected erosion is great, and especially so under desegregation. Most of the intended benefits of desegregation will have been lost at the end of 10 years -- in part to the loss of white students upon desegregation, but due even more to the general loss of white students from city schools, with or without desegregation. Nothing here can be said, of course, about the quality of interracial contact in the two situations.

It is important again to emphasize that these are projections for a hypothetical city with the given characteristics; as is evident in the earlier analysis, the estimated impact of changes in segregation differs from city to city, and in some cities is estimated to be absent.

Altogether, these projections emphasize what data from earlier projections have shown: that the emerging patterns of segregation are those between large cities which are becoming increasingly black, and everywhere else, which is becoming increasingly white. Desegregation in central cities hastens this process of residential segregation but not by a great deal under the conditions specified in the example. It provides a temporary, but fast eroding, increase in interracial contact among children within the central city. In districts with certain characteristics, however, (such as about 75% black and about .4 between-district segregation, as in Detroit, Baltimore, Philadelphia, or Chicago), the impact of full-scale desegregation would be, according to the estimates from page 65,

very large, moving the city's schools to nearly all black in a single year. What would happen in a particular city is unknown; the point here is that the white loss depends very much on the extent of desegregation, the proportion black in the central city and the black-white differential between central city and suburb.

Altogether then, what does this analysis of effects of desegregation in cities indicate? Several results can be specified with some assurance:

1. In the large cities (among the largest 22 central city school districts) there is a sizeable loss of whites when desegregation takes place.

2. There is a loss, but less than half as large, from small cities. These differences due to city size continue to hold when the reduced opportunity of white flight into surrounding school districts in the smaller cities is taken into account.

3. The estimated loss is less in northern cities which have undergone desegregation than in southern ones.

4. In addition to effects of desegregation on white loss, both the absolute proportion of blacks in the central city and their proportion relative to those in the surrounding metropolitan areas have strong effects on loss of whites from the central-city district.

5. Apart from their general effect on white loss, a high absolute proportion of blacks in the central city and a high difference in racial composition between the central-city district and the remaining metropolitan area both intensify the effects of desegregation on rates of white loss.

6. When general rates of white loss for individual cities are taken into account, the desegregation effects still hold to about the same degree as estimated from comparisons among cities.

7. No conclusive results have been obtained concerning the direct effects of desegregation in subsequent years after the first. The indirect effect, however, through increasing the proportion black in the city and the segregation between the city district and suburban ones, is to accelerate the loss of whites.

8. The effect of desegregation on white loss has been widely different among different cities where desegregation has taken place.

9. Because, insofar as we can estimate, the loss of whites upon desegregation is a one-time loss, the long-term impact of desegregation is considerably less than that of other continuing factors. The continuing white losses produce an extensive erosion of the interracial contact that desegregation of city schools brings about.

All this leads to general conclusions consistent with those from earlier sections of this examination: that the emerging problem with regard to school desegregation is the problem of segregation between central city and suburbs; and in addition, that current means by which schools are being desegregated are intensifying that problem, rather than reducing it. The emerging problem of school segregation in large cities is a problem of metropolitan area residential segregation, black central cities and white suburbs, brought about by a loss of whites from the central cities. This loss is intensified by extensive school desegregation in those central cities, but in cities with high proportions of blacks and predominantly white suburbs, it proceeds at a relatively rapid rate with or without desegregation.

REFERENCES

1. Cataldo, Everett; Giles, Michael; Athos, Deborah; and Gatlin, Douglas, "Desegregation and White Flight." Integrateducation, 13 (January-February, 1975).

2. Clotfelter, Charles T. "School Desegregation, 'Tipping,' and Private School Enrollment." Journal of Human Resources (Forthcoming).

3. Farley, Reynolds. "Racial Integration in the Public Schools, 1967 to 1972: Assessing the Effects of Governmental Policies." Sociological Focus, VIII (January, 1975).

4. McDonald, Gary C., and Schwing, Richard C. "Instabilities of Regression Estimates Relating Air Pollution to Mortality." Technometrics, XV (August, 1973).